III-Vs Website Watch

Diving into the European Community pages

European Community web pages, sites, projects, proposals, abstracts, conferences are all out there, but the trick has always been how to find them. Those who take the lazy approach and log onto the Cordis regular email information on key topics are bound to have discovered a whole new world out there. But if you really want to search for specifics in the EC, the European 'must have' research tool is now out in beta format and worth watching. Its taken a Google approach to searching. Very plain uncluttered search pages which let you select your type of information - All Cordis, or ten specifics including news, exploitable results or contacts. Enter your search term and remember to decide on standard or detailed format and relevance or date order sorting. Then sit back to enjoy. Opting for say, 'compound semiconductors' will bring you up four web pages, the first being IST's web and its page on expressions of interest in Microelectronic technology (acronyms) Rapid, Target, Sicwise, Noisetel, Nanoics, Inpegrations, and InP-HBT technology. Other offers are 10 results for partners, 14 for projects, 8 for exploitable results and one programme.

But if you care to get more specific eg. nitrides you'll get one web page, no news or events, one source of funding, 16 possible partners, 37 projects, 21 exploitable results, one programme and three acronyms.

Try quantum wells and find the Oxford QIPC workshop (damn, missed it) July 13-17, 2003 as well as a load of links to project summaries, working groups, network of excellence and an information desk. But, wouldn't you know it, ATESIT 3 IST2000-29681 Teleportation isn't beaming up or down to produce any further information. However a very efficient and swift webmaster found the document '*On active teleportation and entangled state information technology*' being coordinated by Francesco De Mrtini (Email: demartini@axcasp.caspur.it). The project aims at the implementation of the Active Quantum State Teleportation and at the realisation of a source of multiparticle entangled states in quantum superposition by Quantum Injected Optical Parametric Amplification. Active Teleportation will be implemented by employing: a novel high QE optical generator of entangled photons; a fast Electro Optic (EO) scheme for fast switching; a high QE photomultiplier detection system triggering the EO system. The high QE generator of photon couples is based on multiple interaction of a high intensity UV femto second laser beam with a single Type I nonlinear crystal. It allows the generation of all four Bell-type characters of entanglement for photon couples with an expected large QE. The optimisation of this device requires investigation on several aspects of the interaction NL dynamics eg. the study of the role of the spatial field's singularities in non-linear parametric down-conversion. The QE of the detection apparatus will be also improved (up to a value >90%) by a novel radiation-trapping method applied to fast linear detectors, i.e. capable of counting the number of particles detected simultaneously. By adoption of the above results, a quantum-injected optical parametric amplifier will be developed.

This will be used to perform unitary squeezing transformations of the single photon state with generation of all optical multiphoton quantum superposition, or Schroedinger-Cat states. [For the frivolously inclined - Web: http://www.phobe.com/s_cat/s_cat.html]; to implement a universal optimum quantum cloning machine; to implement the three-qubit Quantum Error Correction and Purification protocol for quantum computation; to undertake, by the new methods above, new investigations in the domain of modern quantum measurement physics, eg. by new joint POVM Positive operator valued measurements of non commuting observables; to undertake nonlocality test of violation of Bell inequalities in the multiparticle regime. The Programme will require the joint effort of five scientific laboratories in Leiden, Bristol, Pavia, and Israel.

Web: http://ica.cordis.lu/services/

Diversity behind plain pages

Based at Japan's National Institute for Materials Science, The Nanomaterials Laboratory NML [http://www.nims.go.jp/eng/about/org/ken02.html] is an apparently straightforward Georgian architecture page in blues, green and white which simply give the 14 groups, the leader, the staff and an abstract of work eg. director: Giyuu KIDO Nanophysics Group: We have studied quantum properties in advanced materials. Main topics are as follows: 1. Inquisition of new materials for a solid-state quantum computer. 2. Technical development of the NMR based solid-state quantum computer. 3. Porous aluminum based nano-wire fabrication. 4. Development of radiation detecting device. 5. High field magnetisation of permanent magnets 6. Quantum-optics 7. Technical development of nano-scale circuit on 2D electron system.

Listed groups include nano-function, electro-nano characterisation, nano-device, nano fabrication, nano characterisation, nano synthesis and analysis, nanosynthesis and engineering, opto electronic nano, nano material assembly, nano architecture, nano quantum transport, atomic elecronics and nano-quantum electronics.

The non-standard fun however arrives by on going to explore any of the group pages which are all extremely different; some taking the blue and green colours; some valuing graphics, some sticking to text. One, the Nano-Quantum Electronics Group, hasn't even had the time to create its own webpage yet!

Web: http://www.nims.go.jp/eng/about/org/index.html

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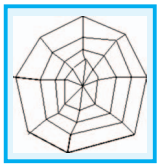

Proving probes leads to EEL

Well intrigued by the development of erasable electrostatic lithography making use of AFM for the creation of quantum devices (page 25), the inevitable was to look for Dr Rolf Crook's page http://www.sp.phy.cam.ac.uk/SPWeb/home/rc230.html And lurking there is another great instrument: a low-noise scanning probe system that operates in a dilution refrigerator (down to 20 mK) in magnetic fields up to 10 T. The probe head can support AFM, STM, or SGM probes. A hybrid, high-frequency, non-invasive probe is under development to sample a semiconductor nanostructure, such as a narrow ballistic channel. The channel functions as a sensitive electrometer to produce images of charging effects in the locality of the channel.

What's new with NEC Compound

Back in July, in line with the initial public offering by NEC Electronics Corporation, the URL of NEC Compound Semiconductor Device changed to http://www/ncsd.necel.com/. It's a very workmanlike green and black strapped site, with very minimal graphics.

Along with Home and Site Map and other expected items, this site rather diffidently offers Press Releases and with much more enthusiasm focuses on "What's New." Quite right too. Catering for analysts is one thing, for the press quite another, though information for the press is useful to the curious.

In August the new topics are in Opto-Electronics where 152 PDFs increase to 154, both dealing with the NX5306 Series as well as a revision of RF and Microwave devices. Here three upgrades enumerate the NESG2021M16 for use in 2.4GHz Wireless LAN, ITS, LNA, SiGeHBT. Alas, no August press releases.

A database to drool over

A compound journalist once related his Russian trip where one Ioffe Institute person he talked to had opened a heavily loaded brief case to show a simply amazing wafer collection of almost every conceivable compound available. The Ioffe Physico-technical Institute carries just as amazing databases on compound semiconductor basic parameters and attributes in its webcase.

"In compiling this information," says its introduction, "we took advantage of generous help from many colleagues at the A F Ioffe Institute who made many excellent suggestions, and, in some cases, provided us with more accurate values of material parameters. The Auger recombination coefficients for semiconductor heterostructures are developed and computed by George Zegrya, Natalia Gunko and Anatolii Polkovnikov. The archive is under construction and in this version we present only a part of the data we have computed. We plan to place more data in the archive later. Your questions, comments and suggestions are welcome. Please contact Vadim Siklitsky [siklitsky@pop.ioffe.rssi.ru] or Alexei Tolmatchev [tolm@mail.ru]. If you find this server helpful, and use the data retrieved through the server for your research, we would appreciate acknowledging it in your papers."

Currently available, Si - Silicon, Ge - Germanium, GaP - Gallium Phosphide, GaAs - Gallium Arsenide, InAs - Indium Arsenide, C - Diamond GaSb - Gallium Antimonide, InSb - Indium Antimonide InP - Indium Phosphide, GaAs1-xSbx - Gallium Arsenide Antimonide, AlxGa1-xAs - Aluminium Gallium Arsenide, InN - Indium Nitride and AlN - Aluminium Nitride GaN - Gallium Nitride The aim is to add new data for: GaxIn1-xAsySb1-y - Gallium Indium Arsenide Antimonide, GaxIn1-xP - Gallium Indium Phosphide, GaxIn1-xAs - Gallium Indium Arsenide, GaxIn1-xSb - Gallium Indium Antimonide; InAs1-xSbx - Indium Arsenide; Antimonide GaxIn1-xAsyP1-y - Gallium Indium Arsenide Phosphide BN - Boron Nitride.

The n, k database gives the refractive index, photon energy and absorption index of II-VI Compounds, Oxides, III-V Compounds Oxynitrides Aluminum Compounds, Silicides, Germanium Compounds, Silicon Metals, Silicon Compounds, Nitrides and even Miscellaneous which takes in oddities like Cadmium Selinide and Telluride, cubic carbon, Thorium Fluoride and even water. Also on offer an Auger index for In1-x1Gax1Asy1 P1-y1/In1-x2Gax2Asy2P1-y2 and calculation made for acceleration, length, pressure, area, mass programming, degrees and radiants, metrology, temperature, energy, power and velocity.

Under hetereo infrastructures come the Quantum Wells Theoretical models for calculation of Auger recombination processes in semiconductor heterostructures. There's the Calculation of gain coefficient of InGaAsP/InP laser structure and the Calculation of ground energy of electron and hole in Quantum Wells as well as a Theoretical model of Quantum Wells in Magnetic Fields and a bibliografic database and ones for quantum wires and dots.

There's even a forum with topics and posts. But alas that seems slow moving with no posts on band structure or carrier concentration, nothing optical, electrical, thermal or mechanical properties, no whisper around elastic constants and lattice vibrations.

Watching conferences come and go with new compound combinations and characteristics continuously emerging, raises the thought that this grand design may be a close to an impossible task. But it's an awesome site.

Web:http://www.ioffe.rssi.ru/SVA/NSM/